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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/043,468	01/10/2002	Warren M. Farnworth	3085.4US (96-1033.4)	7094

24247 7590 03/14/2003

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EXAMINER

NGUYEN, KHIEM D

ART UNIT PAPER NUMBER

2823

DATE MAILED: 03/14/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/043,468

Applicant(s)

FARNWORTH, WARREN M.

Examiner

Khiem D Nguyen

Art Unit

2823

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-30 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akagawa (U.S. Patent 5,677,576) in view of Fallon et al. (U.S. Patent 5,872,051).

Akagawa discloses a method for forming a semiconductor wafer 32 having an active surface, the active surface having bond pads 36 thereon, the method comprising (FIGS. 1-6 and related text):

forming conductive traces 40 over the active surface, each of the conductive traces having a first end, a second end, a top surface, and a bottom surface wherein the bottom surface of the first end of each conductive trace being in contact with at least one of the bond pads (col. 3, lines 10-39);

forming a chamfer between two or more bond pads on the active surface of the semiconductor wafer;

forming a conductive bump 46 comprises depositing a conductive elastomer on the top surface at the second end of the conductive traces wherein the conductive bump having a top portion transverse to the top surface of the conductive traces (col. 3, lines 58-60) and wherein forming the conductive bump comprises placing a volume of solder paste on the at least one of the bond pads and reflowing the paste to form round balls;

dicing the semiconductor wafer to singulate at least one semiconductor die (FIG. 1) wherein at least one singulated semiconductor die has a back and sides and further comprising forming a layer of encapsulation material (38, 48) on the semiconductor die to cover the back and sides of at least one singulated semiconductor die wherein forming the layer of encapsulation material over the back surface of the semiconductor wafer comprises overcoating the back surface of the semiconductor wafer with a glass or plastic material (FIG. 6, 47) and wherein the layer of encapsulation material is formed over the back surface prior to reforming the conductive bump to a preplanarized shape; and

forming a layer of encapsulation material 42 to cover the active surface of the semiconductor wafer and to surround the conductive bump wherein forming a layer of encapsulation material comprises at least partially overcoating the active surface of the semiconductor wafer and the conductive trace with a resin or glass material and wherein forming a layer of encapsulation material comprises placing the semiconductor wafer in a mold and injecting the encapsulation material into the mold (col. 3, lines 47-48).

Akagawa fails to disclose planarizing the top portion of the conductive bump and reforming the conductive bump to a preplanarized shape extending above the layer as recited in present claims 1 and 24.

Fallon discloses planarizing the top portion of the conductive bump 624 (FIG. 25 and related text) and reforming the conductive bump to a preplanarized shape 630 extending above the layer (FIG. 26) wherein planarizing the top portion comprises compressing the top portion of the conductive bump with a platen (FIG. 25, 670) and wherein reforming the conductive bump comprises reflowing the conductive bump to a

Art Unit: 2823

substantially spherical shape. It would have been obvious to one of ordinary skill in the art of making semiconductor devices to combine the teaching of Akagawa and Fallon to enable the conductive bump of Akagawa to be formed and furthermore to obtain a simpler, less critical, more accurate, and less expensive method for bumping flip-chips and for bumping carrier modules (col. 6, lines 13-15).

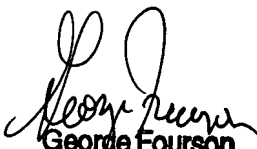
Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D Nguyen whose telephone number is (703) 306-0210. The examiner can normally be reached on Monday-Friday (8:00 AM - 5:00 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chaudhuri Olik can be reached on (703) 306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 746-9179 for regular communications and (703) 746-9179 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

K.N.
March 8, 2003


George Fourson
Primary Examiner
2823